iDig

User Manual

Menu

Manual Version: 2.00

Software Version: 2.03

Language: English

UBEXi

See www.ubexi.com for more detailed information.

Safety Information: Magnets

Use caution with the powerful magnets in iDig mounting plates

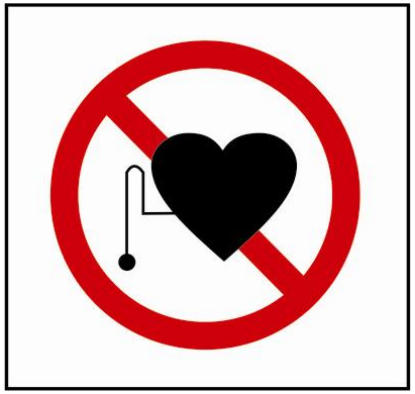
The mounting plates used to secure the sensors to the excavator use extremely strong rare earth magnets. They must be handled with care to avoid personal injury and damage to the magnets. Fingers and other body parts can get severely pinched between two attracting magnets or other metal surface.

Use caution when removing the magnetic mounting plates from the carrying case. When handling them, be aware of their strong attraction to any nearby steel surface (such as the other mounting plates or metal back plates of the sensors).

Other warnings about rare earth magnets

Never allow rare earth magnets near a person with a pacemaker or similar medical aid. The strong magnetic fields of the magnet can affect the operation of such devices.

The strong magnetic fields of rare earth magnets can also damage magnetic media such as credit cards, magnetic I.D. cards, cassette tapes, floppy disks, video tapes or other such items. They can also damage computer hard drives, televisions, VCRs, computer monitors and other CRT displays. Never place rare earth magnets near electronic appliances.



Children should not be allowed to handle rare earth magnets as they can be dangerous. Small magnets pose a choking hazard and should never be swallowed or inserted into any part of the body.

Rare earth magnets are brittle, and can peel, crack or shatter if allowed to slam together. Do not modify or machine them. Eye protection should be worn when handling these magnets, because shattering magnets can launch pieces at great speeds. They will lose their magnetic properties if heated above 80°C (175°F). Rare earth magnets should never be burned, as burning them will create toxic fumes.

Safety Information: Laser

SAFETY LABELS

The One-Dot Laser used for first-time setup is a Class 2 laser, manufactured to comply with the international rules of safety IEC 60825-1, 2001. Although the power of the emission of the beam is less than 5mW in Class 2, the following cautions are recommended:

- Do not stare directly at the beam
- Do not set up the laser at eye level

Introduction

Use the system to dig with an excavator to a desired depth and create a leveled plane or to set a slope and create a tilted surface. Also use it to determine reach, such as for the width of a trench.

All the digging information is referenced to the center of the bucket blade (or teeth) and the depth value shown is the distance from the actual teeth position to the target depth.

Sensors measure the angle of the boom, stick, and bucket. The information is transmitted instantly to the cab display. LEDs tell you how far to dig.

A simple one-time procedure allows the iDig system to “learn” the dimensions of your machine. That is how it constantly calculates, in real time, where the bucket tip is in relation to the target depth.

Excavator rotation and movement

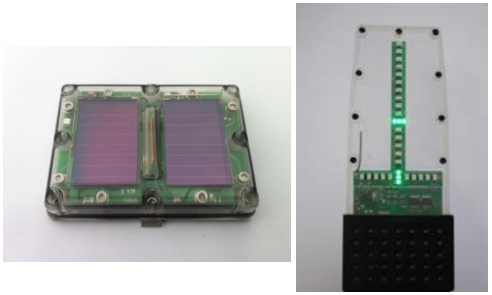
With iDig, the operator has to dig “straight ahead” (only moving the booms/bucket in and out).

After the target depth has been set, the chassis has to stay stable. Any rotation of it may produce an error depending on the inclination.

Rotation of the chassis can be compensated by using a fourth sensor as a “pitch” sensor on the chassis. This will automatically correct forward and backward tilting movements of your machine as well as rotation, providing accurate depth information.

Every time that the excavator tracks are moved, it’s necessary to zero again the reference (target) depth on a previous point or, depending on the setup, take the laser height again.

Safety Information: Radio



FCC Labels on sensors & LED Display

PRECAUTIONS

The product must not be disposed with household waste.
Dispose of the product appropriately in accordance with the national regulations in force in your country.

ELECTROMAGNETIC COMPATIBILITY (EMC)

Description

The term Electromagnetic Compatibility is taken to mean the capability of the product to function smoothly in an environment where electromagnetic radiation and electrostatic discharges are present, and without causing electromagnetic disturbances to other equipment.

⚠ WARNING

Electromagnetic radiation can cause disturbances in other equipment. Although the product meets the strict regulations and standards which are in force in this respect, the manufacturer cannot completely exclude the possibility that other equipment may be disturbed.

⚠ CAUTION

There is a risk that disturbances may be caused in other equipment if the product is used in conjunction with accessories from other manufacturers, for example field computers, personal computers, two-way radios, nonstandard cables or external batteries.

Precautions:

Use only the equipment and accessories recommended by the manufacturer. When combined with the product, they meet the strict requirements stipulated by the guidelines and standards. When using computers and two-way radios, pay attention to the information about electromagnetic compatibility provided by the manufacturer.

⚠ CAUTION

Disturbances caused by electromagnetic radiation can result in erroneous measurements. Although the product meets the strict regulations and standards within this respect, the manufacturer cannot completely exclude the possibility product may be disturbed by very intense electromagnetic radiation, near radio transmitters, two-way radios or diesel generators.

Precautions:

Check the plausibility of results obtained under these conditions.

⚠ WARNING

If the product is operated with connecting cables attached at one of their two ends, for example, external supply cables, interface cables, the permitted level of electromagnetic radiation may be exceeded and the correct functioning of other products may be impaired.

Precautions:

While the product is in use, connecting cables, for example product to external battery, product to computer, must be connected at both ends.

Safety Information: Radio

FCC STATEMENT, APPLICABLE IN U.S.

⚠ WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communication. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notice for Canada

This Class B digital device meets all requirements of Canadian Radio Standards Specification RSS-210.

Cet appareil numérique de la Class B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

⚠ WARNING

Changes or modifications not expressly approved by the manufacturer for compliance could void the user's authority to operate the equipment.

RESPONSIBILITIES

Manufacturer of the product: The manufacturer is responsible for supplying the product, including the user manual and original accessories, in a completely safe condition.

Person in charge of the product: The person in charge of the product has the following duties:

- To understand the safety instructions on the product and the instructions in the user manual.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform the manufacturer immediately if the product and the application becomes unsafe.

⚠ WARNING

The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use.

HAZARDS OF USE

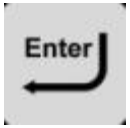
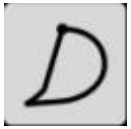
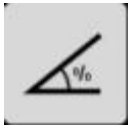
⚠ WARNING

The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial and environmental consequences.

Precautions:

All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.

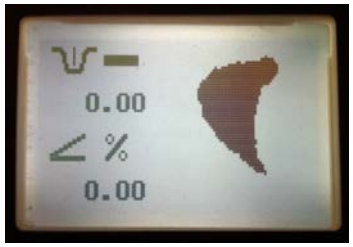
Keypad

	Press once: To confirm any setting in progress. Press & hold: To enter the USER MENU.
	In the working screen: To scroll through the various operator screens. In text menu: To move the cursor down.
	In the working screen: To scroll through the various operator screens. In text menu: To move the cursor up.
	Depth value setting: To set a new distance to the target depth. Calibration mode: To make the digits jump for faster settings.
	Press once: To change to an already calibrated bucket Press & hold: To calibrate a brand new bucket
	Short-press: To set a slope: % or ratio (eg: 1:2) Press & hold: To change from % to ratio.

	Press once: For laser acquisition (reference the depth value to the laser plane). Press & hold: To set a depth value relating to the laser plane height.
	Press once: To set back the depth, slope or menu values to „0“. To delete the 1st laser catch. Press & hold: To set back the reach to „0“. To exit any menu point.
	Press once to cycle through the horn settings: Off, On, Loud. When horn is ON, alarm will sound to warn of overdigging if bucket is too low (accelerating beeps).
	Press & hold to choose the dead band settings. Fine: 1cm (0.5“), Medium: 5cm (1“), Coarse: 10cm (2“)

User Menu
How to access the User Menu

Operating Screen



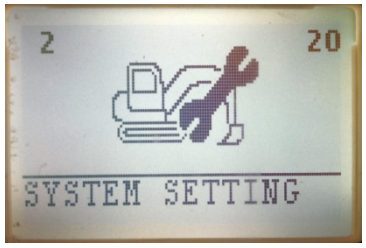
Long-press „Enter“ to access the User Menu

-Possible from operating screens 1-3

Basic Setting

Press „Down“ to proceed to the System Setting

System Setting



Press „Down“ to proceed to the Advanced Setting

Advanced Setting

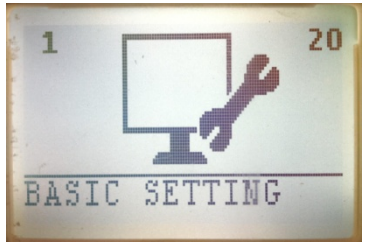
Press „Down“ to loop back to the Basic Setting

OR

Long-press „0“ to go back to the operating screen from any menu

Basic Setting
Set Contrast

Basic Setting



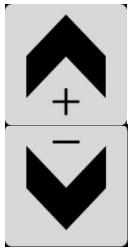
Press „Enter“ to access the Basic Setting

Set Contrast

Press „Enter“ to access the contrast setting

Set Contrast

Press & hold „Up“ or „Down“ to change the contrast. Press „Enter“ to save



Set Contrast

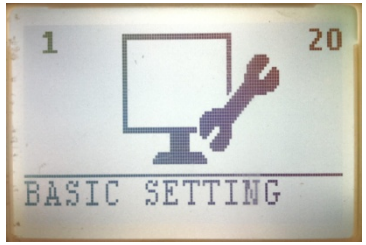
Long-press „0“ to exit the Basic Setting

OR

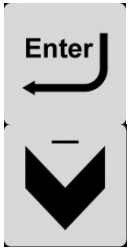
Press „Down“ to proceed to the language setting

Basic Setting
Set Language

Basic Setting



Press „Enter“ to access the Basic Setting and press „Down“ to get to the language setting

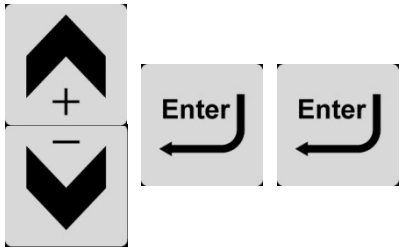


Set Language

Press „Enter“ to access the language setting

Set Language

Choose with „Down“ or „Up“ your language and confirm with „Enter“. Re-confirm with „Enter“.



Set Contrast

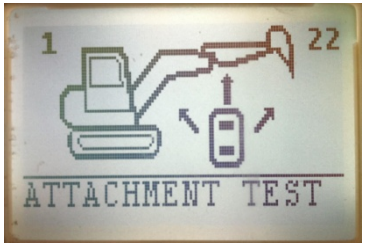
Long-press „0“ to exit the Basic Setting

System Setting
Attachment Test

System Setting

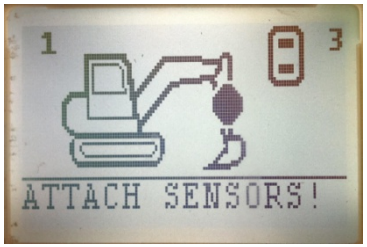
Press „Enter“ to access the System Setting

Attachment Test



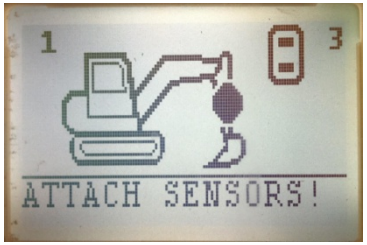
Press „Enter“ to access the Attachment Test

Attachment Test



Refer to the „Setup & Operation“ user manual for details

Attachment Test

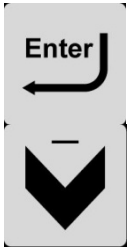


Long-press „0“ to exit the Attachment Test

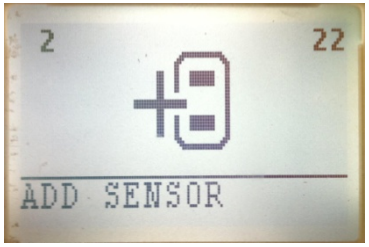
System Setting
Add Sensor

System Setting

Press „Enter“ to access the System Setting and press „Down“ to get to the Add Sensor menu

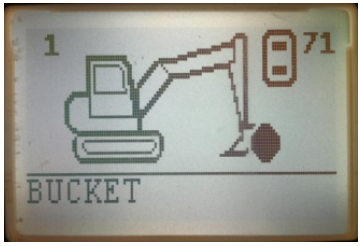


Add Sensor



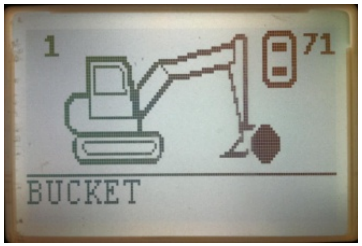
Press „Enter“ to access the Add Sensor menu

Add Sensor



Refer to the „Extra Sensor“ user manual for details

Add Sensor

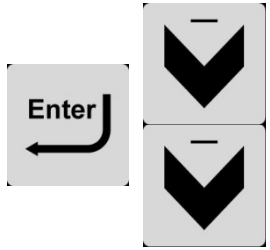


Long-press „0“ to exit the Add Sensor menu

System Setting
Calibration

System Setting

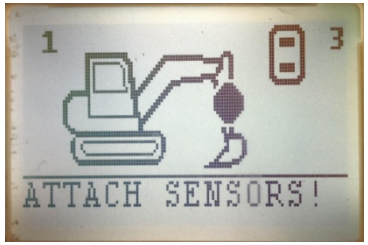
Press „Enter“ to access the System Setting and press 2 times „Down“ to get to the Calibration menu



Calibration

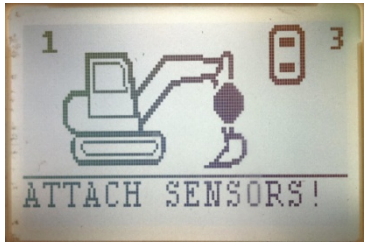
Press „Enter“ to access the Calibration menu

Calibration



Refer to the „Setup & Operation“ user manual for details

Calibration

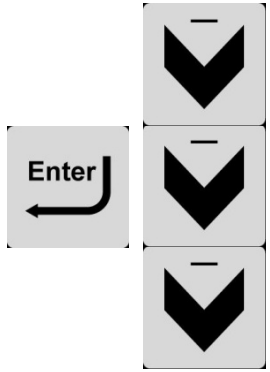


Long-press „0“ to exit the Calibration menu

System Setting
Laser Calibration

System Setting

Press „Enter“ to access the System Setting and press 3 times „Down“ to get to the Laser Calibration menu



Laser Calibration

Press „Enter“ to access the Laser Calibration menu

Laser Calibration

Refer to the „Setup & Operation“ user manual for details

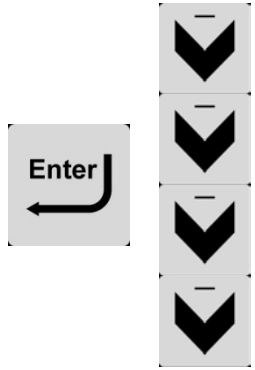
Laser Calibration

Long-press „0“ to exit the Laser Calibration menu

System Setting
Chassis Calibration

System Setting

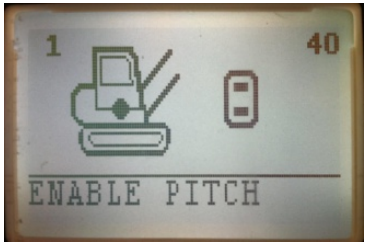
Press „Enter“ to access the System Setting and press 4 times „Down“ to get to the Chassis Calibration menu



Chassis Calibration

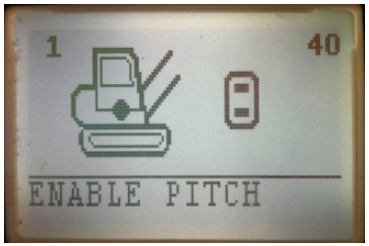
Press „Enter“ to access the Chassis Calibration menu

Chassis Calibration



Refer to the „Extra Sensor“ user manual for details

Chassis Calibration



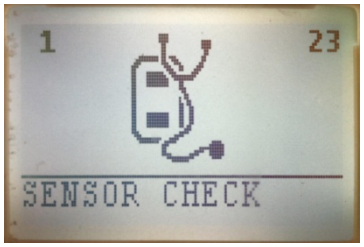
Long-press „0“ to exit the Chassis Calibration menu

Advanced Setting
Sensor Check

Advanced Setting

Press „Enter“ to access the Advanced Setting

Sensor Check



Press „Enter“ to access the Sensor Check

Sensor 1 (bucket) angle is indicated

Press „Down“ to see the sensor‘s battery status

Note: The value „flickers“ in case of proper sensor operation. A partially or continuous frozen value indicates communication problems. Please refer to the „Troubleshooting Guide“ in this case.

Sensor 1 (bucket) battery voltage is indicated

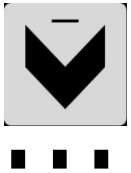
Press „Down“ to see the next sensor‘s status

Note: A battery status of „0“ does NOT indicate an empty battery, but that the sensor isn‘t communicating with the system.

Advanced Setting
Sensor Check

Sensor 2 (dipper stick) angle is indicated

Proceed by pressing „Down“ if you like to see the other sensor values



Sensor identification

1: Bucket
2: Dipper Stick
3: 2nd Boom
4: Main Boom
5: Pitch (Chassis)

Value meaning

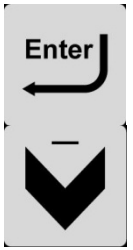
Angle value „flickering“: o.k.
Angle value partially „frozen“: Bad communication
Angle value „frozen“: Lost signal, not communicating
Angle value=0: Not assigned or not existing
Battery value (Volt): >= 3.30: good
Battery value (Volt): < 3.30: low
Battery value (Volt): 0: Not assigned or not communicating

Long-press „0“ to exit the Sensor Check

Advanced Setting
Machine Check

Advanced Setting

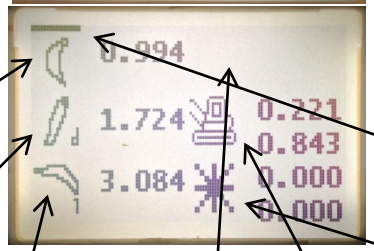
Press „Enter“ to access the Advanced Setting and press „Down“ to get to the Machine Check



Machine Check

Press „Enter“ to access the Machine Check

Machine Check
(Machine in use)



This screen informs you about each element‘s calibration lengths <u>of the machine in use</u>, which is indicated by the top left bar.

Press „Down“ to get to the next screen

Bucket
0,994m

Dipper Stick
1,724m

Main Boom
3,084m

2nd Boom
N/A

Chassis
AB: 0,221m
BC: 0,843m

Laser Receiver
N/A

Machine Check
(1st stored Machine)

Short-press „0“ (confirmed with „Enter“) if you want to delete this machine‘s data

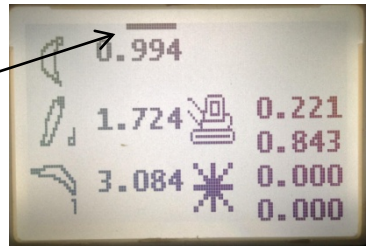
Long-press „0“ to exit this menu

Advanced Setting
Machine Check

Machine Check
(1st stored Machine)

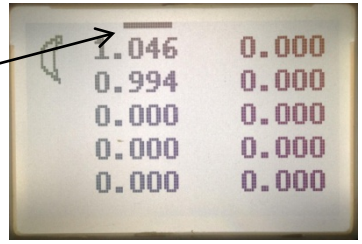
Press „Down“ to view the 2nd stored machine‘s data

Machine Check
(2nd stored Machine)



Press „Enter“ to view this machine‘s stored buckets

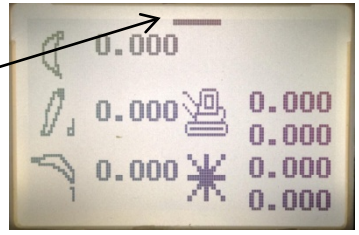
Machine Check
(2nd stored Machine‘s stored Buckets)



Short-press „0“ (confirmed with „Enter“) if you want to delete all this machine‘s stored buckets

Long-press „0“ to exit this menu

Machine Check
(3rd stored Machine)



All data „0.000“ means, that no 3rd machine is stored

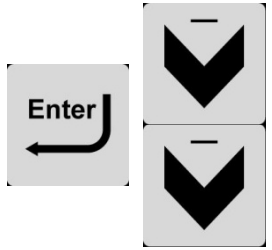
Note:
Any Machine Check data modifications need to be saved with „SAVE ALL“ to be effective after a system reboot!

Long-press „0“ a few times to exit the Machine Check

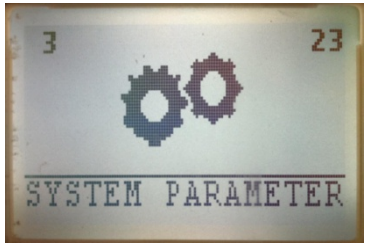
Advanced Setting
System Parameter

Advanced Setting

Press „Enter“ to access the Advanced Setting and press 2 times „Down“ to get to the System Parameter menu.

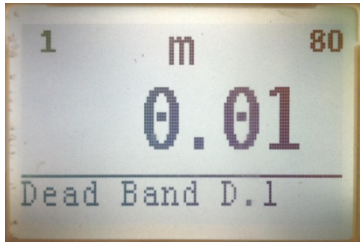


System Parameter

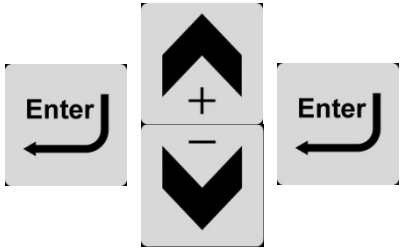


Press „Enter“ to access the System Parameter menu.

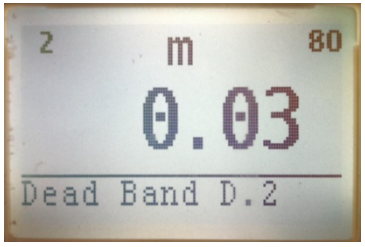
Dead Band Fine



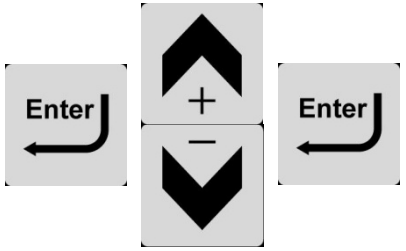
Default LED deadband setting for „Fine“: 0,01m
If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



Dead Band Medium



Default LED deadband setting for „Medium“: 0,03m
If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



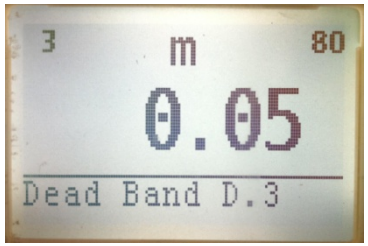
Advanced Setting
System Parameter

Dead Band Coarse

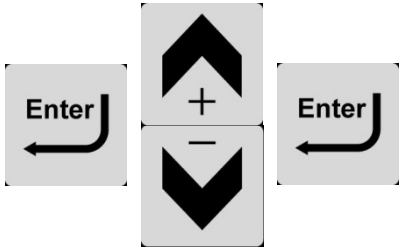
LED Top

LED Bottom

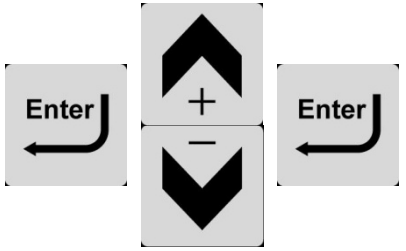
Dead Band Reach

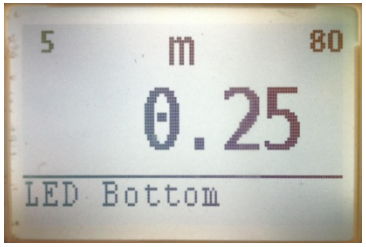


Default LED deadband setting for „Coarse“: 0,05m
If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.

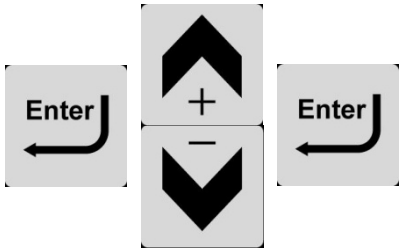


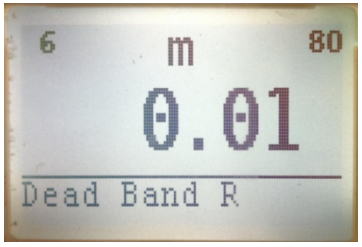
Default value for the LED indication „too high“: 0,50m. Each LED is 5cm (50/10).
If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



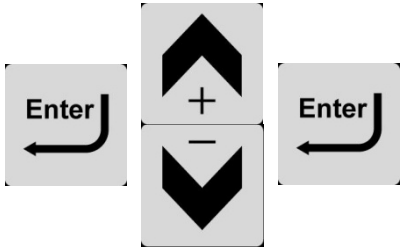


Default value for the LED indication „too low“: 0,25m. Each LED is 5cm (25/5).
If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.





Default LED deadband setting for the reach: 0,01m
If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



Advanced Setting
System Parameter

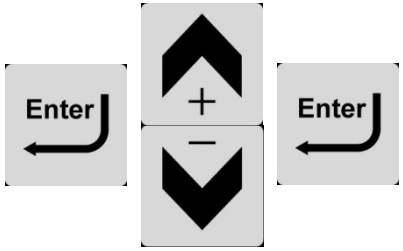
LED Far

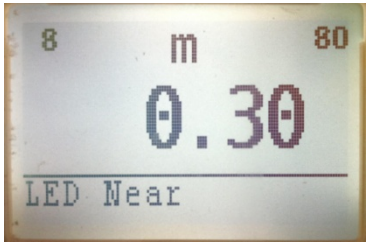
LED Near

Ope. Blink Depth

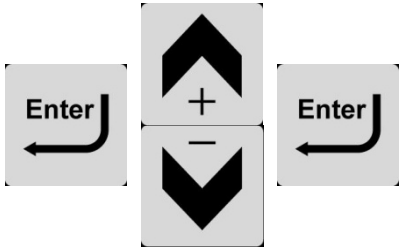
Max Vibration

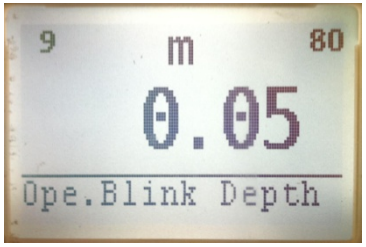
Default value for the LED reach indication „Too far“: 0,30m. Each LED is 6cm (30/5=6).
If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



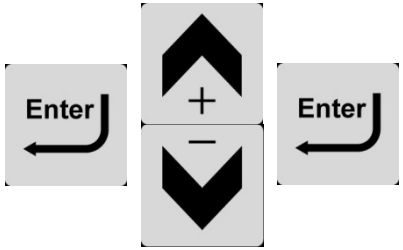


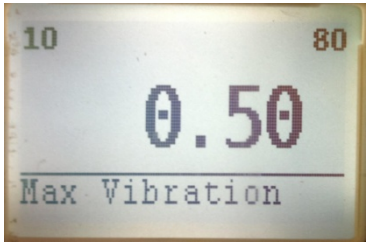
Default value for the LED reach indication „Too close“: 0,30m. Each LED is 6cm (30/5=6). If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



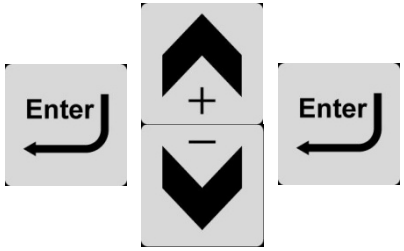


Default value when the LCD elevation value should blink when overdigging: 0,05m. If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



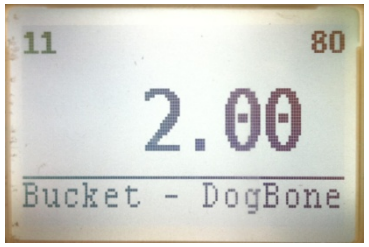


Default Value for indicating „Machine Vibration too high“: 0,5°. If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.

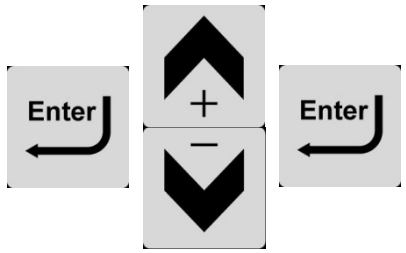


Advanced Setting
System Parameter

Bucket - Dogbone

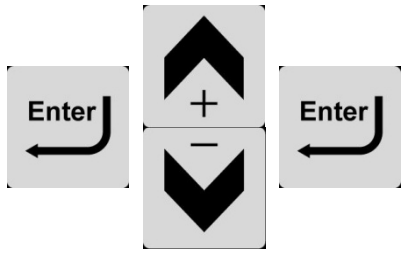


Default value for the system to identify during bucket calibration if the bucket sensor is attached on the bucket or dogbone. If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.

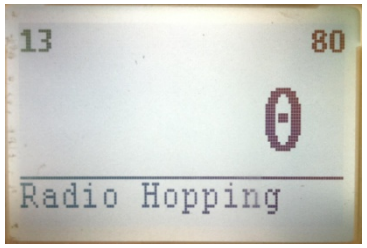


Radio Channel

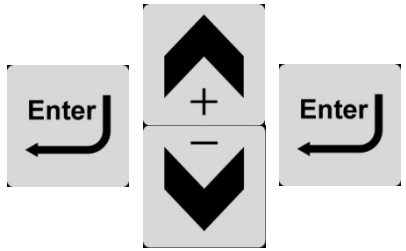
Default radio communication channel of the system: 11. If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



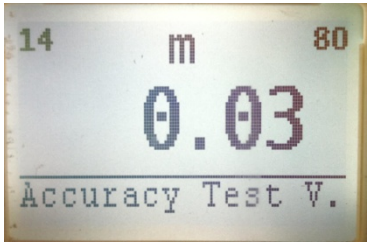
Radio Hopping



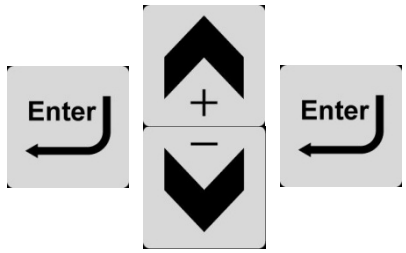
Default value if the system should change the radio channel automaticallly in case of radio „noise“: 0 (off). If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



Accuracy Test V.



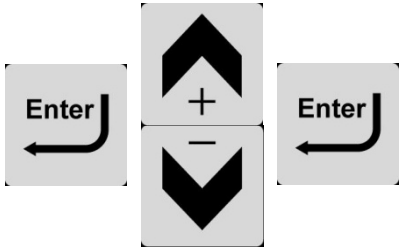
Default Value for indicating a passed initial System Check: 0,03m. If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



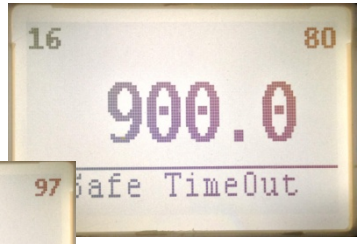
Advanced Setting
System Parameter

L. Cal. Delta Ang.

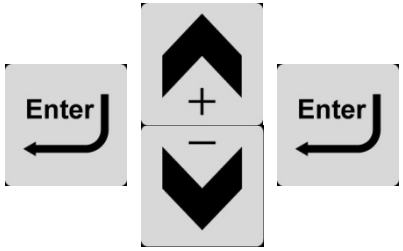
Default value for a tolerated movement of the main boom during automatic laser calibration: 1,00°. If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



P.Safe TimeOut

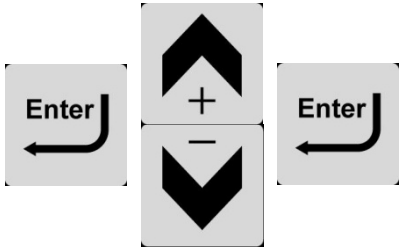


Default value of the time passing without sensor activity (see value below) until the sensors go into the stand-by mode: 900 sec. If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.
A setting of „0.0“ disables the sensor stand-by.



P.Safe Threshold

Default value for a tolerated movement of any sensor, not to set back the counter for the sensor stand-by: 3,00°. If required, it may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.

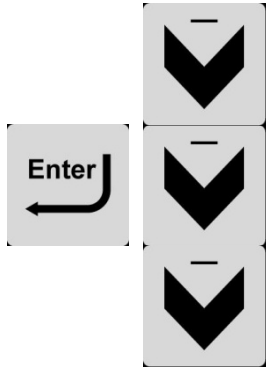


Note:
All System Parameter settings shown in this user manual are based on the assumption of units been chosen in metric.
Note:
Parameters written ***bold & cursiv*** in this user manual should only changed by service personal, as changing those values may cause a malfunction of the complete system!
Note:
If a System Parameter value gets changed, and shall be recalled after a controlbox reboot, you need to store the new settings with „SAVE ALL“ in the Advanced Setting.

Advanced Setting
Manual Calibration

Advanced Setting

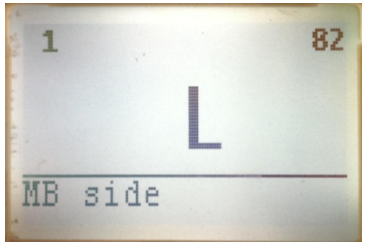
Press „Enter“ to access the Advanced Setting and press 3 times „Down“ to get to the Manual Calibration menu.



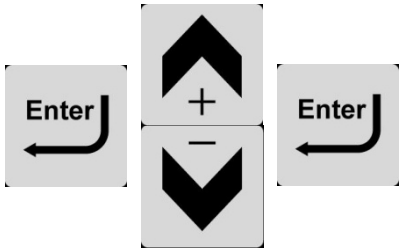
Manual Calibration

Press „Enter“ to access the Manual Calibration menu.

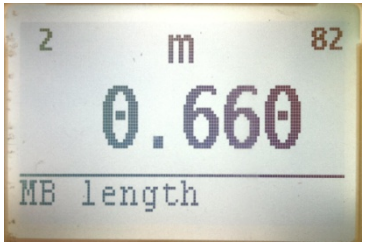
Main Boom Side



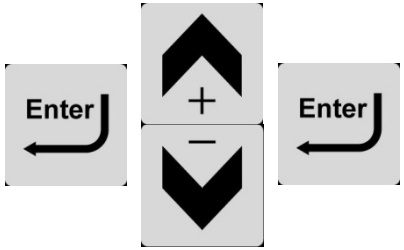
Attachment side of the main boom („MB“) sensor. It may be changed from „R“ (right) to „L“ (left) or „OFF“ (disabled) by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



MB length

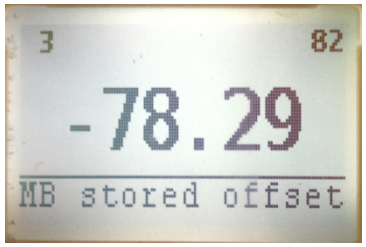


Length of the main boom („MB“). It may be changed by pressing „Enter“ and the „Up/Down“ arrow keys. Confirm with „Enter“.



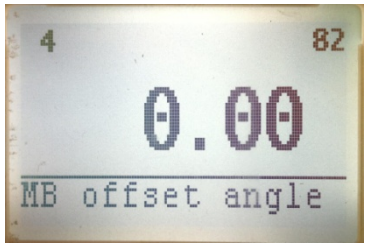
Advanced Setting
Manual Calibration

MB stored offset

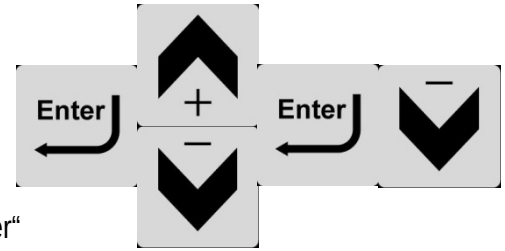


Actual (stored) offset angle of the main boom („MB“) sensor.

MB offset angle



Set the actual angle of the main boom.
Access setting with „Enter“ and use the Up/Down arrow keys to change.
0.00°=horizontal,
-90.00°=vertical,
or measure and dial-in. Proceed with „Enter“ & „Down“.



MB get offset

Confirm the actual angle setting with „Enter“. It‘s mandatory that you haven‘t moved any excavator‘s element between the value setting and the confirmation!

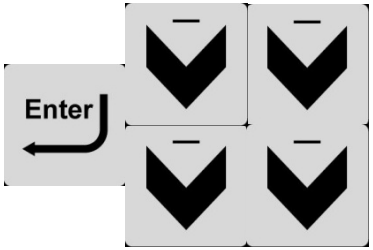
SB/DS

Follow the same description above to manually calibrate the second boom („SB“) and/or the dipper stick („DS“).
After completion save the new values using the „SAVE ALL“ option in the Advanced Setting.

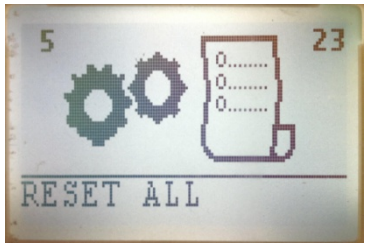
Advanced Setting
Reset All

Advanced Setting

Press „Enter“ to access the Advanced Setting and press 4 times „Down“ to get to the RESET ALL menu.



Reset All



Press „Enter“ to set back the system to the factory settings.

Enter to confirm

Press „Enter“ again to confirm to set back the system to the factory settings. Note that all calibration data or changed Parameter Settings will be lost. Sensor assignments will NOT get lost. Long-press „0“ if you changed your mind.

or

Save in progress

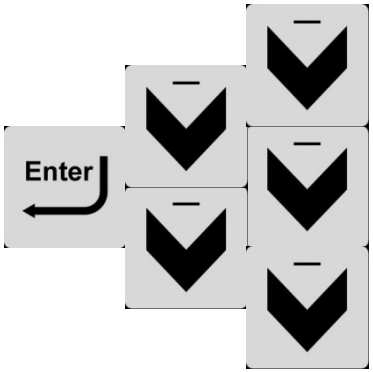
In case you confirmed the system will reboot after setting back the system to the factory settings.

Note:
The following parameters will NOT be set back performing the „Reset All“:
-Low/High distance of the mini tripod
-Radio Channel

Advanced Setting
Save All

Advanced Setting

Press „Enter“ to access the Advanced Setting and press 5 times „Down“ to get to the SAVE All menu.



Save all

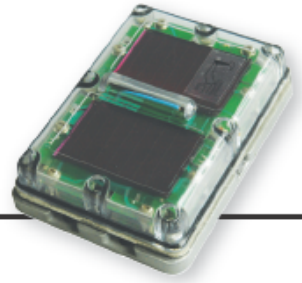
Press „Enter“ to save the actual settings.

Save in progress

Saving.

Note:
Manual saving is mandatory after modifying the following values or performing the following operations:
-Manual main boom, second boom or dipper stick calibration
-Machine Check data modification
-System Parameters

iDig



Options

- Sensor for 2nd boom
- Sensor for chassis (pitch)
- iDig laser receiver
- Kit for extra machine: 3 magnetic mounting plates for sensors, 2 suction cup mounts and cradles for cab items

Specifications subject to change without notice. 7/11

Specifications

Accuracy: +/- 1cm (3/8″)
Choice of depth deadband: Fine 1cm (1/2″); Medium 3cm (1″); Coarse 5cm (2″)
Reach deadband: 3cm (1″)
Choice of metric or feet
Sensors: IP68 Control unit and display: IP64
Control unit power: 9-27V
Operating temperatures: -20° to +70° C (-4° to 158° F)
Sensor: 70 x 100 x 20mm; 282g (3″ x 4″ x 1″; 10 oz.)

UBEXi

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